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OF THE

ROYAL ASTRONOMICAL SOCIETY.

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Rev. CHARLES PRITCHARD, President, in the Chair.

Sir Andrew Scott Waugh, 7 Petersham Terrace;
Balfour Stewart, Esq., Observatory, Kew;
William Ladd, Esq., Beak Street, Regent Street;
S. M. Yeates, Esq., 2 Grafton Street, Dublin; and
F. H. Varley, Esq., 337 Kentish Town Road,
were balloted for and duly elected Fellows of the Society.

Notice explanatory of a series of MS. Charts, containing the Estimated Magnitudes of Stars visible to the Naked Eye in both Hemispheres, presented by him to the Royal Astronomical Society. By Sir J. F. W. Herschel, Bart.

The examination of a Manuscript Chart containing my views of the comparative magnitude of the stars visible to the naked eye in *Corona* and its neighbourhood on the 9th of June, 1842, having led me to call the attention of the Astronomical Society to the existence of a star distinctly visible at that date in a situation very suspiciously near to the place of the extraordinary star which has recently blazed forth in that constellation,* I have been induced to think that it may not be un-

* See *Monthly Notices of the Royal Astronomical Society*, vol. xxvi. p. 299.

acceptable to possess, for occasional reference, in case of any such occurrence in future, a whole series of similar records, made both at the Cape of Good Hope and in England, in pursuance and part fulfilment of a general plan for observing and recording all the stars visible to the naked eye, and their estimated magnitudes at the dates of their respective observation. I should have gone further in the prosecution of this task, and perhaps, (as regards the northern hemisphere) carried it out to its completion, had not the indefatigable labours of Professor Argelander in the same direction been given to the world while my own work was yet in progress, and induced me to relinquish a task, certainly of great labour, and which henceforward could only be considered as of secondary interest. I think it a pity, however, that the record of a large amount of work which *was* bestowed on the subject by myself should not in some way or other be preserved; were it only for its possible utility to any future observer who, having detected a new variable star, may desire to know whether or not it was visible at the epoch when the particular spot occupied by it in the heavens fell under my observation. And I can think of no better way to secure this object than by consigning the charts to the Archives of this Society (not, of course, with any view to their publication, which is quite out of the question, but) with a view to their preservation, and occasional consultation, when desired. I beg leave, therefore, respectfully to place them before the Society, and request their acceptance of them in their present state, rough and imperfect as it is. In that state I consider them preferable to any copies which I could make, which, though neater and apparently more finished, could hardly be executed without introducing numerous errors.

The basis of the construction of these Charts is the *Atlas Cœlestis* of Bode for the year 1801; the stars in each having been pricked off from those in the *Atlas*, with leading marks for laying down the meridians of R.A. and the declination circles, which were (or remain to be) subsequently drawn, from those indications. The papers being so prepared, and the very large and conspicuous stars (down to the third magnitude at least) indicated in pencil with their letters affixed, (as preliminary guides to the eye) were compared with the heavens; and (as a first result of such comparison) broken up into triangles or compact quadrilaterals of convenient and moderate area; which were then outlined in pencil for examination of their contents, *seriatim*, as opportunity and weather should occur. Each angle of the several figures was occupied by a star sufficiently distinguished to admit of no doubt as to its identity. In this way the whole surface of the heavens was resolved into 738 compartments (not, perhaps, as it turned out, always the best chosen) which, for brevity, although not always such, I shall call triangles. In each of them when sub-

jected to individual scrutiny, the stars were laid in (in pencil at the time—subsequently perpetuated in ink) with their estimated magnitudes represented by numeral figures, unaccented, or once, or twice accented to denote fractional magnitudes (as for instance 5, 5′, 5″ to denote 5m, 5..6m, 6..5m) so as to break each whole magnitude into three "grades." In estimating these grades, neighbouring stars were compared, so as to preserve, as well as might be, a consistency of scale.

This, at least, was the system adopted and adhered to after working in some few of the earlier triangles. In those dated in January, February, and March 1837, the stars visible in each triangle were merely marked in the order in which they were seen (and therefore *most probably* in the order of their magnitudes), as denoted by small figures ①, ②, &c., and inclosed in circles and attached to each. Lettered stars, however, were usually not so numbered. But this system of notation was soon found to be inadequate, and in the charts of the later months of 1837, and all subsequent, the magnitudes were attached. In all cases, however, when all the stars in any triangle which could be discerned on the night of observation were marked (whether Bode's or not) the triangle was considered as "worked," and marked either with a single or double cross (× ※) or with the sign ⏃. The stars of the 5th, 6th, or 7th magnitudes surrounded with a circle are from Bode; those not so surrounded, or inclosed in a small triangle, have been laid in by the eye, from configurations with the neighbouring known stars. In some of the Cape Charts the relative magnitudes of the angular stars were attempted to be indicated by the greater or lesser sizes of their pencilled disks, which are carefully preserved in the subsequent ink-marks.

The stars pricked down from Bode in the Skeleton Charts (except in crowded districts) comprised all or nearly all marked by him as 6m. and upwards—rarely, if ever, any marked as 7m. It is unnecessary to say that the estimated magnitudes, attached from actual observation, are not unfrequently very different from Bode's.

In "working" any triangles, the *numerical* magnitudes of the angular stars, when very conspicuous, were not very scrupulously attended to, these having been made, or intended to have been made, the subject of special photometric determination. The results of this, so far as it has extended, are already before the public in my Cape Observations (for Southern stars) and for Northern ones in the Appendix to my *Outlines of Astronomy*. In the interior area, the stars pricked off from Bode (but no way otherwise distinguished except by the letters attached in the Atlas, which were annexed in pencil to the pin-mark) were first looked for. If found they were *pencilled* in, and the estimated magnitudes annexed; if not, the fact was usually indicated by crossing out the pin-mark and attaching the words "*not seen*," or their abbreviation

"*ns.*" Occasionally a small opera-glass was used in such cases, which explains the occurrence of the remark "*not seen,*" (or "*ns*") "*in op. gl.*" The dates of working the Charts, and for the most part of the individual triangles, stand recorded on the sheets.

The presence of any portion of the Milky Way in a triangle was, for the most part, carefully noted, and the relative intensity of its several regions imitated as well as the feeble light used for marking the stars, and the more or less dampness of the paper, would allow. These indications have been allowed to remain in pencil, as they could not be inked without altering the relative intensity of the shading. The delineation of the Milky Way, however, was made a matter of separate and independent study.

Each triangle is numbered, and the numbers are entered correspondingly in two INDEX CHARTS, pricked off from those of Bode, marked as *Hemisphærium Arietis* and *Hemisphærium Virginis*, in which also I have pencilled in, from the working charts, the course of the Milky Way; which may (though rudely done) offer some interest, as the only representation (so far as I am aware) of the whole course of that wonderful zone through both hemispheres, which has yet been given from individual personal observation. The Magellanic Clouds are also laid down in their true places,—the larger in triangles 383, 384; the lesser in 316.

It will be noticed that two sets of numbers occur, the one series in black ink, the other in red. This arose from some of the quadrilateral or polygonal figures used in the working of the charts having (as an after-thought) been broken up into triangles, for convenience of reference: a black-ink polygon thus forming two or more red-ink triangles. The red are those to be adopted and adhered to, should any occasion arise for future reference.

To facilitate such reference, an index is annexed, numerically arranged, in order of the red-ink numbers, by the help of which (the triangle referred to being first found on the Index Charts and its number ascertained) the particular chart or charts on which it has been worked is identified as R A S. 1; R A S. 2; &c. up to R A S. 113. The first 101 of these charts are on paper of uniform size (4to dem/). The others, (unfortunately) are of irregular sizes; but their numberings are continued on, as if uniform, from R A S. 102 up to 113.

Collingwood, Jan. 26, 1867.